

WHAT IS CLAIMED IS:

1. A portable gas fractionalization apparatus, comprising:
a compressor which compresses a gas, such as air, to provide a feed gas;
plural adsorbent beds which receive said feed gas and output a purified gas and a waste gas;
a battery which supplies power to said compressor; and
a housing which comprises an ambient air inlet, an ambient air outlet, and plural compartments, a first of which contains said adsorbent beds and a second of which contains said compressor, said compartments significantly inhibit migration of thermal energy from the second compartment to the first compartment.
2. The apparatus of Claim 1, further comprising an air circulation fan which draws air through the inlet into the first compartment, and through the first compartment into the second compartment, said air being exhausted through the outlet.
3. The apparatus of Claim 2, wherein said housing further comprises a circuitous air passageway through which the air is directed to flow, said air passageway having an upstream portion and a downstream portion.
4. The apparatus of Claim 3, wherein the upstream portion of the air passageway is positioned adjacent the first compartment and the downstream portion of the air passageway is positioned adjacent the second compartment.
5. The apparatus of Claim 4, wherein the first compartment further contains heat sensitive components including a plurality of valves interconnected to said adsorbent beds and a circuit board having control circuitry which governs the operation of said valves.
6. The apparatus of Claim 3, wherein air in the downstream portion of the air passageway is substantially inhibited from flowing into the upstream portion.
7. The apparatus of Claim 3, further comprising a plurality of sound absorbing baffles positioned along at least a portion of the air passageway.
8. The apparatus of Claim 2, wherein said fan is positioned directly above the compressor and produces an air stream directly against said compressor.
9. A portable gas fractionalization apparatus, comprising:
a housing comprising a chassis and a shell; and

a plurality of components mounted on and structurally supported by said chassis, said shell covering said components and removable from said chassis without removing said components.

10. The apparatus of Claim 9, wherein the shell has an opening adapted to receive a filter which filters fluid output from said apparatus, said filter being accessible from the exterior of the shell.

11. The apparatus of Claim 9, wherein the shell has a plurality of sidewalls, at least one sidewall having a concave or convex section that provides curvature to the sidewall so as to reduce coupling of sound or vibration energy generated by components in the housing.

12. The apparatus of Claim 9, wherein the chassis comprises a plurality of integral structures adapted to receive and support said components.

13. The apparatus of Claim 12, wherein the chassis comprises an integral compressor mount.

14. The apparatus of Claim 12, wherein the chassis comprises an integral battery slot.

15. The apparatus of Claim 12, wherein the chassis comprises at least one integral gas flow passageway.

16. The apparatus of Claim 9, wherein the chassis provides an intermediary vibration isolation between the components and the shell.

17. The apparatus of Claim 9, wherein the housing further comprises a hatch that is removably attached to the shell so as to provide access to one or more components therein.

18. A portable gas fractionalization apparatus, comprising:

a compressor which produces a feed gas;

plural adsorbent beds connected to receive the feed gas and produce a purified gas and a waste gas from said feed gas;

a battery; and

a conduit connected to deliver said waste gas to said battery to cool the battery.

19. The apparatus of Claim 18, wherein said battery is positioned in a battery compartment, wherein said conduit delivers waste gas to a space between said battery and said battery compartment.

20. The apparatus of Claim 19, wherein said battery compartment is comprised of a thermal sleeve positioned around said battery.

21. The apparatus of Claim 18, wherein said waste gas comprises a nitrogen rich gas.

22. A method of producing oxygen, comprising:

providing an oxygen concentrator having an air compressor which supplies compressed air to a PSA unit, said PSA unit comprising plural adsorbent beds and a plurality of valves which control fluid flow to and from said beds;

generating an air flow through said concentrator by inputting air through an inlet and outputting the air through an outlet, such that the air flows along a flow path through the concentrator; and

exposing said valves to an upstream portion of the flow path and exposing the air compressor to a downstream portion of the flow path, such that said valves are substantially isolated from air that flows through the downstream portion of the flow path.

23. The method of Claim 22, further comprising directing said air flow to flow along a circuitous flow path through the concentrator.

24. The method of Claim 22, wherein generating an air flow comprises using an air circulation fan to produce an air stream directly against said air compressor.

25. The method of Claim 22, further comprising substantially inhibiting air in the downstream portion of the flow path from circulating back into the upstream portion.

26. The method of Claim 22, further comprising providing a plurality of sound baffles along at least a portion of said flow path.